



Micro On The Move

No more peering at maps or worrying about running out of petrol: the car of the future will see you safely and economically to your destination



Dynamic Dashboard

The dashboard of your next car could well look similar to the one pictured here. All the moving dials and needles used in conventional dashboards have been replaced by a computer-controlled read-out terminal. The light-emitting

diodes can monitor speed, the petrol level, and the temperature with greater speed and accuracy than electro-mechanical instruments. Dashboards such as these are already in use on current models of cars such as the Austin Maestro

COURTESY OF TOYOTA

One of the ways in which we will see the direct relevance of computer technology at work is in the car. Already you can buy a vehicle that will calculate when it needs a service and tell you when a visit to the garage is due.

The car is able to do this because sensors attached to various engine points feed details such as mileage and temperatures into a micro-processor, which evaluates the conditions under which the car has been driven. The driver knows when a service is due because the tiny computer operates a series of green, amber and red lights on the dashboard. When the green lights go out and the red lights come on, the driver knows the car needs a service.

There are cars made in Europe and Japan that speak to the driver, telling him to put on the seatbelt or warning him of impending engine trouble such as overheating or low water and oil levels. The car can do this because it has a voice synthesiser; a computer into which the characteristics of a human voice have been programmed digitally. This is called digital sound because the sound waves are turned into the binary numbers that the computer can understand.

When the engine sensors detect a warning condition the computer activates the voice synthesiser, which then turns the computer's digital output into the sound of a human voice through a loudspeaker.

A Smooth Ride

Another way in which computers can improve

cars is by controlling the suspension. Lotus Cars is working on a process called 'active suspension'. This technique uses a computer to adjust the stiffness and flexibility of the shock absorbers many times a second so that the car will hold the road well whether it is loaded with passengers and luggage or whether there is just one driver.

Usually sports cars have a stiff suspension so they can hold the road well. But the disadvantage is that the ride is hard and passengers feel every bump. But if a car has a soft suspension to give a 'cottonwool' ride it will not corner as well because the car body can roll too much. Computer-controlled suspension will give the best of both worlds.

Navigation computers are also being developed by Honda and Toyota. These computers tell the driver the direction in which he should be travelling. It can do this by measuring the car's speed, direction, and distance travelled and comparing this with a map of the correct route held in its memory. The driver can then decide whether to turn left or right or go straight ahead according to a series of indicators on the dashboard.

One of the more common computers available in cars measures fuel consumption and can work out the estimated time of arrival. The driver knows how much fuel he is using at any given moment as well as being told by the computer what the average speed of the journey was. Some of the more advanced in-car computers enable the driver to program a cruising speed. The car will then maintain this speed without the driver needing to touch the accelerator.

Computers installed in long-distance juggernauts have a more serious purpose. They serve as an electronic log and enable traffic authorities to determine how long the driver was at the wheel and what his speed was, as well as the distance travelled.

One of the most valuable benefits offered by in-car computers is improved fuel efficiency. BMW, the German car manufacturer, already has a range of cars with a system that determines the optimum mixture of petrol and air required for any given driving condition.

In effect this is like 'tuning' the car so many times a second to give the best possible fuel consumption. The system works by continually measuring the fuel and air mixture and making adjustments to take account of the car's speed, the gear being used, and the engine temperature.

The Future

So what can we expect to see in the future in the way of in-car computers? Theoretically it would be possible for the computer to take over the entire driving function. All the driver would have to do would be to program the car computer with the destination. The computer could then automatically drive the car using information fed to it from sensors buried in the road or by communicating with central traffic computers. Another development we could expect to see is a computer radar that would automatically adjust the car's speed if the vehicle was driven too close to the car in front.

Over the next few years the conventional dial instruments will be phased out. They will be replaced by a monitor screen-style of dashboard with computer graphics. The car driver will be able to call up the electronic display of the information he wants such as engine temperature or fuel level. Driving information could be projected on to the windscreen so the driver would never have to take his eyes from the road. It is also likely that cars will be fitted with computers that would immediately tell the mechanic of any problem. A mechanic would connect the car computer to the garage's pre-programmed computer which would instantly analyse the condition of all the components and identify those that were wearing out or faulty. The photograph below shows the prototype of Honda's dashboard-mounted computerised navigational system



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